

**Background, Objectives, and Selection Criteria**

**BACKGROUND**

Immunization rates vary throughout the state of Minnesota. The Minnesota Department of Health (MDH) identified 12 ZIP codes with historic and current immunization rates that lag behind other areas of the state. In 2011 the MDH Immunization Program, along with their partners, began a year-long pilot project called the High Risk ZIP Code Project.

**OBJECTIVES**

- To increase immunization rates in the 12 selected ZIP codes.
- To determine effective ways to conduct patient follow-up.

**SELECTION CRITERIA**

**ZIP codes**

- More than 50 children between 24 and 36 months of age in the Minnesota Immunization Information Connection (MIIC, the state immunization registry) for the ZIP code.
- Current 4:3:1:3:3:1:4\* up-to-date (UTD) rate below 40%.
- Lower quartile in three of the following four data sources: retrospective kindergarten studies of 4:3:1\*\* UTD rates from 1993, 1997, 2002 and current 4:3:1 data from MIIC.
- Family poverty level above 5.1% (Minnesota's rate, Census 2000).

**Study population**

- Minnesota residents with a Minnesota Immunization Information Connection (MIIC) record.
- Born between November 2, 2007, and November 1, 2008.
- Residing in one of the 12 identified ZIP codes (Figure 1).
- Not located in an area with existing population level reminder/recall.

**Analysis and Methods**

**ANALYSIS**

The study population was queried to determine the UTD status for the 4:3:1:3:3:1:4 series. The query yielded 4,888 children who met the inclusion criteria. Of the 4,888 children, 651 (13.3%) were removed due to duplicate MIIC entries or incomplete names (e.g. first name "baby boy"). The initial UTD rate of the study population was 38.5%.

**METHODS**

**Parent letters** (See Figure 2)

- Parents of not UTD children were contacted via letter (sent quarterly starting in February 2011).
- Letters were sent to all parents in English with key informations translated into Spanish, Hmong and Somali. The letter also included:
  - ✓ A personalized immunization report (from MIIC).
  - ✓ A list of low cost or free clinics in their area.
  - ✓ An opt out postcard.

**Phone survey follow up**

- A random sample of parents of eligible children (those who had not opted out, moved from the defined ZIP codes, were not UTD at the time of the query, address in MIIC not "undeliverable," no new shots added to MIIC since start of project) were called and given a brief survey (5 minutes or less).

**Returned mail follow up**

- Ramsey County WIC.
- MIIC alternative addresses.

**Control ZIP codes**

- Twelve control ZIP codes were followed with quarterly evaluations.
- Not UTD children living in the control ZIP codes did not receive patient follow-up letters.
- Control ZIP codes were matched on population size, poverty level, and urban/rural setting when possible.

**Barriers**

MIIC data completeness is an important aspect of this project. Clinics with low MIIC participation or known obstacles were contacted and MIIC historical data entry was offered.

**Returned mail**

**Follow up from Ramsey County WIC**

- 396 not UTD cohort members were found in the Ramsey County WIC database.
- 154 letters resent (8% returned).
- Very time consuming.

**Follow up from alternative address field in MIIC**

- Letter resent with alternative address if primary address was undeliverable.
- 39 letters resent (56% returned).
- Not very effective.

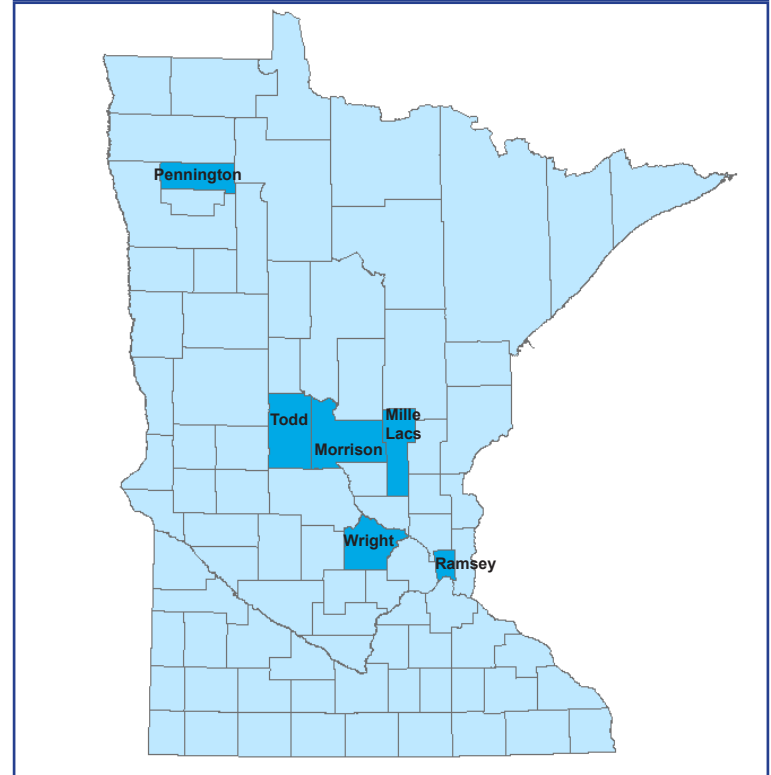
**Opt out**

- 195 (<1%) of parents opted out of the project.

**Phone survey**

- 1,071 children eligible for phone survey.
- 569 (53.1%) had phone number in MIIC.
- Random sample of 100 called.
- 65 phone numbers called were valid.
- 28 lost to follow up (3 or more calls not returned).
- 32 parents agreed to be interviewed, 6 declined.

**Figure 1. Geographic Location of Counties Containing High Risk ZIP Codes**



**Figure 2: Letters Sent, Letters Returned, and Opt Outs by ZIP Code and Quarter**

| ZIP code | County     | Quarter 1 |      |         | Quarter 2 |      |         | Quarter 3 |      |         | Quarter 4 |      |         |
|----------|------------|-----------|------|---------|-----------|------|---------|-----------|------|---------|-----------|------|---------|
|          |            | Sent      | Rtnd | Opt out | Sent      | Rtnd | Opt out | Sent      | Rtnd | Opt out | Sent      | Rtnd | Opt out |
| 55101    | Ramsey     | 36        | 20   | 0       | 26        | 13   | 1       | 13        | 3    | 0       | 9         | 0    | 0       |
| 55102    | Ramsey     | 130       | 31   | 3       | 130       | 14   | 13      | 68        | 7    | 5       | 64        | 3    | 4       |
| 55103    | Ramsey     | 150       | 36   | 2       | 113       | 18   | 4       | 88        | 7    | 2       | 68        | 4    | 1       |
| 55104    | Ramsey     | 365       | 53   | 17      | 291       | 32   | 12      | 230       | 19   | 9       | 195       | 14   | 1       |
| 55106    | Ramsey     | 740       | 175  | 17      | 518       | 66   | 12      | 398       | 33   | 1       | 334       | 28   | 2       |
| 55107    | Ramsey     | 192       | 41   | 5       | 145       | 15   | 6       | 121       | 11   | 3       | 105       | 11   | 0       |
| 55117    | Ramsey     | 420       | 98   | 12      | 302       | 38   | 6       | 239       | 16   | 2       | 194       | 12   | 3       |
| 56479    | Todd       | 61        | 13   | 4       | 48        | 8    | 2       | 35        | 1    | 1       | 32        | 1    | 1       |
| 56353    | Mille Lacs | 81        | 9    | 7       | 66        | 7    | 6       | 55        | 4    | 1       | 54        | 1    | 1       |
| 56466    | Morrison   | 26        | 2    | 0       | 23        | 0    | 0       | 22        | 1    | 0       | 22        | 2    | 2       |
| 56701    | Pennington | 85        | 11   | 3       | 64        | 2    | 4       | 51        | 0    | 2       | 42        | 4    | 1       |
| 55321    | Wright     | 63        | 8    | 8       | 45        | 0    | 5       | 39        | 3    | 3       | 37        | 0    | 1       |
| Totals   |            | 2346      | 497  | 78      | 1744      | 105  | 71      | 1359      | 105  | 29      | 1156      | 80   | 17      |

**Figure 3: Shots Added to MIIC**

|  |      |
|--|------|
| Number of not UTD children with shots added to MIIC      | 1039 |
| Total shots added to MIIC for not UTD children           | 6479 |
| New shots added (administered after start of project)    | 1616 |
| Old Shots added (administered prior to start of project) | 4863 |
| Range of shots added                                     | 1-23 |
| Mean number of shots added                               | 6.24 |
| Standard deviation of shots added                        | 6.09 |

**Results**

- The UTD rate increased by over 15%, from 38.5% to 54.9% in selected ZIP Codes compared to an increase of only 5%, from 46.9% to 51.1% in the control ZIP Codes.
- 6,479 shots added to MIIC for children originally not UTD in selected ZIP Codes (Figure 3).
- 1,039 children with updated immunization records.
- 1,616 (24.9%) were new shots (administered after start of project)
- 4,863 (75.1%) were old shots (administered prior to start of project, represent lack of data completeness).

**Next Steps**

- Continue project with a new set of ZIP codes and new patient cohort in 2012.

\* The 4:3:1:3:3:1:4 includes 4 or more doses of DTP or DTaP vaccine, 3 or more doses of polio virus vaccine, 1 or more doses of any MMR vaccine, a complete Hib series, 3 or more doses of Hepatitis B vaccine, and 1 or more doses of Varicella vaccine (or history of disease) and a complete PCV series.

\*\*The 4:3:1 series includes only 4 or more doses of DTP or DTaP vaccine, 3 or more doses of polio virus vaccine, 1 or more doses of any MMR vaccine.